Department of Permitting Services
Residential Energy Code

255 Rockville Pike, 2nd Floor, Rockville, Maryland 20850

INTRODUCTION

Montgomery County has adopted and is currently enforcing the 2000 Edition of the International Residential Code (IRC). Chapter 11 of the IRC sets standards for building energy performance and incorporates by reference the 2000 Edition of International Energy Conservation Code (IECC). IECC is a performance-based national code, which regulates the design of new attached and detached single-family dwellings for thermal resistance, air leakage, and mechanical, electrical, water-heating, and lighting systems efficiency.

DEFINITIONS

DEGREE DAY, HEATING.
A unit, based upon temperature difference and time, used in estimating heating energy consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18°C), there are as many degree days as there are degrees Fahrenheit (Celsius) difference in temperature between the mean temperature for the day and 65°F (18°C). Annual heating degree days (HDD) are the sum of the degree days over a calendar year. **MONTGOMERY COUNTY USES 4700 DEGREE DAYS.**

RESIDENTIAL BUILDING, TYPE A-1.
Detached one- and two-family dwellings.

RESIDENTIAL BUILDING, TYPE A-2.
A building containing multiple (i.e., three or more) dwelling units where the occupants are primarily permanent in nature, such as townhouses, row houses, apartment houses, convents, monasteries, rectories, fraternities and sororities, dormitories, and rooming houses, all of which are three stories or less in height above grade.

HEATING AND AIR CONDITIONING APPLIANCE AND EQUIPMENT PERFORMANCE

Performance of equipment listed in Table below is covered by preemptive Federal law. Appliances and equipment not listed in this Table shall meet the minimum efficiency requirements of Section 503.2 of the International Energy Conservation Code.

EQUIPMENT CATEGORY	SUB-CATEGORYe	REFERENCED STANDARD	MINIMUM PERFORMANCE
Air-cooled heat pumps heating mode < 65,000 Btu/h cooling capacity	**Split systems** **Single package**	**ARI 210/240**	**6.8 HSPF a,b** **6.6 HSPF a,b**
Gas-fired or oil-fired furnace < 225,000 Btu/h	**—**	**DOE 10 CFR Part 430,** **Subpart B, Appendix N**	**AFUE 78% b** **Et 80% c**
Gas-fired or oil-fired steam and hot–water boilers < 300,000 Btu/h	**—**	**DOE 10 CFR Part 430,** **Subpart B, Appendix N**	**AFUE 78% b,d**
Air-cooled air conditioners and heat pumps cooling mode < 65,000 Btu/h cooling capacity	**Split systems** **Single package**	**ARI 210/240**	**10.0 SEERb** **9.7 SEERb**

For SI: 1 Btu/h = 0.2931 W.

a. For multicapacity equipment, the minimum performance shall apply to each capacity step provided. Multicapacity refers to manufacturer–published ratings for more than one capacity mode allowed by the product's controls.

b. This is used to be consistent with the National Appliance Energy Conservation Act (NAECA) of 1987 (Public Law 100–12).

c. These requirements apply to combination units not covered by NAECA (three–phase power or cooling capacity 65,000 Btu/h).

d. Except for gas-fired steam boilers, for which the minimum AFUE shall be 75 percent.

e. Seasonal rating.

There are several methods of achieving compliance with the Energy Conservation Provisions of the IRC and IECC. For the purpose of this manual, four methods are offered. One is a simplified package that indicates compliance with IRC, but has limitations on the glazing amount. The second package is a prescriptive requirement based on the IECC and developed by the Department of Energy. The third package requires compliance on a component-by component basis. These three packages only address building envelope performance and equipment efficiencies. Please refer to the IRC and IECC for additional requirements. The fourth package permits the use of REScheck computer software to indicate compliance.

METHOD 1

COMPLIANCE WITH SIMPLIFIED PRESCRIPTIVE REQUIREMENTS OF IRC, CHAPTER 11

In order to meet the requirements of Method 1, the following conditions must be met:

Residential buildings, Type A-1 with a glazing area that does not exceed **15** percent of the gross area of exterior walls

OR

Residential buildings, Type A-2 with a glazing area that does not exceed **25** percent of the gross area of exterior walls.

Simplified Prescriptive Building Envelope Thermal Component Criteria Minimum Required Thermal Performance (U-Factor And R-Value)							
HDD	Maximum Glazing U-Factor [Btu / (hr · ft2 · ºf)]	Minimum Insulation R-Value [(hr · ft2 · ºF) / Btu]					
		Ceilings	Walls	Floors	Basement walls	Slab perimeter R-value and depth	Crawl space walls
4,500-4,999	0.45	R-38	R-16	R-19	R-8	R-6, 2 ft.	R-17

For SI: 1 Btu/ (hr · ft2 · ºF) = 5.68W/m2 · K, 1 (hr · ft2 · ºF)/Btu = 0.176m2 · K/W.

SIMPLIFIED PRESCRIPTIVE PACKAGE WORKSHEET

Applicant Name _____ Date _____
Applicant Address _____
Phone Number _____
Building Address _____ Permit (A/P) # _____

Criteria	Required	Provided	Describe the Assembly
Maximum Glazing U-Factor [BTU / (hr · ft2 · ºf)]	0.35		
Minimum Insulation R-Value (Ceilings)	R-38		
Minimum Insulation R-Value (Walls)	R-16		
Minimum Insulation R-Value (Floors)	R-19		
Minimum Insulation R-Value (Basement walls)	R-8		
Minimum Insulation R-Value (Slab perimeter R-value and depth)	R-6, 2 ft.		
Minimum Insulation R-Value (Crawl space walls)	R-17		

Gross Area of Exterior Walls = _____ ft²

Area of Glazing = _____ ft²

Percent glazing = _____ %

I hereby certify that the proposed building design represented in these construction documents has been designed to meet the simplified prescriptive requirements of the Montgomery County Energy Code.

_____ _____ _____
Builder/Designer/Contractor Company Name Date

METHOD 2

COMPLIANCE WITH PRESCRIPTIVE REQUIREMENTS OF IECC (Based on REScheck)

This method describes one of the simplest compliance approaches. With this approach, you select a package of insulation and window requirements from a list of packages developed for a specific climate zone (in this case, Montgomery County). Each package specifies insulation levels, glazing areas, glazing U-factors, and sometimes heating and cooling equipment efficiency. Once selected, simply meet or exceed all requirements listed in the package to achieve compliance. Few calculations are required.

Prescriptive Packages Overview

The REScheck Prescriptive Packages were developed to demonstrate compliance with the insulation and window requirements of the Council of American Building Officials (CABO) Model Energy Code (MEC). REScheck includes prescriptive packages that demonstrate compliance with the 1992, 1993, and 1995 editions of the MEC and the 1998 and 2000 editions of the International Energy Conservation Code (IECC). All illustrations in this chapter are based on packages which demonstrate compliance with the 2000 IECC.

The prescriptive package approach requires minimal calculations and is the simplest method for demonstrating compliance with the code insulation and window requirements for residential buildings. The REScheck materials include prescriptive package for one- and two-family buildings (referred to as single-family buildings).

Quick Start

This section provides quick-and-easy instructions for using the REScheck prescriptive packages.

Find Your Climate Zone

The REScheck Prescriptive Packages give requirements for climate zones which fall along county boundaries. ***Montgomery County is Climate Zone 10***.

Select a Prescriptive Package

Tables of prescriptive packages are included with this. Each climate zone has a table of prescriptive packages from which you can select one package. If your building meets the insulation R-value, glazing, and heating and/or cooling equipment efficiency requirements specified for the package you select, then the building complies with the code insulation and window requirements. Refer to the first page of the prescriptive package tables for notes that further clarify the requirements.

Complete the Prescriptive Package Worksheet

Fill in the *Prescriptive Package Worksheet* to document your building's compliance with the insulation and window requirements of the code. Be sure to include the prescriptive package number for the package you selected. Copy the glazing area percentage, R-value, and U-factor requirements specified in your selected package to the corresponding blanks on the right side of the worksheet. Write in the glazing area of your building and your proposed insulation R-values and glazing and door U-factors on the left side of the worksheet. If the package you selected requires high-efficiency heating or cooling equipment, record the efficiency, make, and model number of the equipment you intend to install.

Check for Compliance

Your building complies if:

- your glazing area is less than or equal to the required glazing area, and
- all proposed insulation R-values are greater than or equal to all required insulation R-values, and
- all proposed glazing and door U-factors are less than or equal to all required glazing and door U-factors, and
- your heating and cooling equipment meets the requirements specified for the package you selected.

PRESCRIPTIVE PACKAGE WORKSHEET

Applicant Name _____ Date _____

Applicant Address _____

Building Address _____ Permit (A/P) # _____

Package Number _____ Phone Number _____

PROPOSED **REQUIRED**

Glazing Area

100 × _____ ÷ _____ = _____ _____ %

Glazing Area | Gross Wall Area | Proposed Glazing Area | Maximum Glazing Area

R-Value

Assembly	Description	Proposed R-Value	Minimum R-Value
Ceiling		R-	R-
Wall		R-	R-
Floor over unconditioned space		R-	R-
Floor over outside air		R-	R-
Basement wall		R-	R-
Slab floor		R-	R-
Crawl space wall		R-	R-

U-Factor

Assembly	Description	Proposed U-Factor	Maximum U-Factor
Glazing		U-	U-
Opaque Door		U-	U-**0.35**

Equipment Efficiency (This section maybe left blank if *Normal* is selected on the right)

Heating _____ AFUE/HSPF _____

Cooling _____ SEER _____

Efficiency | Make and Model Number

Check One
☐ Normal
☐ High heating
☐ High Heating & Cool

I hereby certify that the proposed building design represented in these construction documents has been designed to meet the requirements of the Montgomery County Energy Code.

_____ _____ _____

Builder/Designer/Contractor | Company Name | Date

ZONE 10 (MONTGOMERY COUNTY)
2000 IECC

Step by Step Instructions

Step 1: Determine the glazing area %.

Step 2: The glazing area percentage is a maximum, so as long as any buildings built with the selected package have less than or equal to the listed glazing area percentage, the buildings will comply with the selected code. Each component requirement must be met within the selected package, otherwise select another package or use Method 4, which can calculate trade-offs for compliance.

Step 3: Complete the Prescriptive Package Worksheet provided or available online at **www.energycodes.gov/rescheck/prescriptive.stm.**

Single-Family Prescriptive Package

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency9
	Glazing Area %1	Glazing U-Factor2	Ceiling R-Value3	Wall R-Value4	Floor R-Value5	Basement wall R-Value6	Slab Perimeter R-Value7	Crawl Space R-Value8	
1	8%	0.55	R-30	R-13	R-15	R-8	R-2	R-12	Normal
2	12%	0.65	R-38	R-19	R-19	R-9	R-7	R-17	Normal
3	12%	0.50	R-38	R-14	R-19	R-9	R-5	R-16	Normal
4	12%	0.45	R-30	R-13	R-19	R-9	R-6	R-17	Normal
5	15%	0.55	R-38	R-19	R-21	R-10	-	R-22	Normal
6	15%	0.45	R-38	R-16	R-19	R-9	R-6	R-17	Normal
7	15%	0.40	R-38	R-13	R-19	R-9	R-5	R-16	Normal
8	18%	0.45	R-38	R-19	R-19	R-9	R-7	R-17	Normal
9	18%	0.37	R-38	R-15	R-19	R-9	R-6	R-16	Normal
10	20%	0.37	R-38	R-16	R-19	R-9	R-6	R-16	Normal
11	25%	0.33	R-38	R-19	R-19	R-9	R-6	R-17	Normal
12	12%	0.75	R-38	R-11	R-19	R-8	R-2	R-17	High Heating
13	12%	0.65	R-38	R-13	R-11	R-6	-	R-8	High Heating
14	15%	0.65	R-30	R-13	R-19	R-9	R-2	R-22	High Heating
15	15%	0.50	R-30	R-13	R-11	R-6	-	R-8	High Heating
16	18%	0.55	R-30	R-13	R-19	R-9	R-2	R-22	High Heating
17	18%	0.45	R-38	R-13	R-11	R-5	-	R-8	High Heating
18	22%	0.55	R-38	R-17	R-19	R-9	R-2	R-22	High Heating
19	22%	0.40	R-30	R-13	R-13	R-6	R-2	R-10	High Heating
20	12%	0.75	R-30	R-13	R-15	R-7	R-2	R-14	High Heat/Cool
21	12%	0.65	R-26	R-13	R-13	R-6	-	R-10	High Heat/Cool
22	15%	0.70	R-30	R-15	R-19	R-9	R-2	R-22	High Heat/Cool
23	15%	0.55	R-26	R-13	R-13	R-6	R-2	R-10	High Heat/Cool
24	18%	0.65	R-38	R-19	R-15	R-7	R-2	R-14	High Heat/Cool
25	18%	0.50	R-38	R-13	R-13	R-6	-	R-10	High Heat/Cool
26	22%	0.60	R-38	R-17	R-26	R-11	R-8	-	High Heat/Cool
27	22%	0.45	R-38	R-13	R-15	R-7	R-2	R-12	High Heat/Cool

Townhouse Prescriptive Package

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency9
	Glazing Area %1	Glazing U-Factor2	Ceiling R-Value3	Wall R-Value4	Floor R-Value5	Basement wall R-Value6	Slab Perimeter R-Value7	Crawl Space R-Value8	
1	15%	0.70	R-38	R-13	R-11	R-5	R-0	R-6	Normal
2	15%	0.60	R-26	R-11	R-11	R-5	R-0	R-5	Normal
3	20%	0.60	R-26	R-13	R-19	R-9	R-4	R-15	Normal
4	20%	0.50	R-26	R-11	R-13	R-6	R-0	R-7	Normal
5	25%	0.53	R-30	R-13	R-11	R-5	R-0	R-6	Normal
6	25%	0.50	R-38	R-13	R-15	R-7	R-2	R-10	Normal
7	25%	0.45	R-38	R-13	R-11	R-5	R-0	R-6	Normal
8	30%	0.45	R-38	R-13	R-19	R-9	R-6	R-15	Normal
9	30%	0.40	R-49	R-13	R-11	R-5	R-0	R-6	Normal
10	15%	0.90	R-19	R-11	R-11	R-5	R-0	R-6	High Heating
11	20%	0.75	R-26	R-11	R-11	R-5	R-0	R-7	High Heating
12	25%	0.70	R-30	R-13	R-15	R-7	R-2	R-13	High Heating
13	25%	0.65	R-30	R-13	R-11	R-5	R-0	R-7	High Heating
14	30%	0.60	R-30	R-13	R-15	R-7	R-2	R-14	High Heating
15	30%	0.55	R-26	R-13	R-11	R-5	R-0	R-8	High Heating
16	15%	0.90	R-19	R-11	R-11	R-4	R-0	R-5	High Heat/Cool
17	20%	0.75	R-26	R-11	R-11	R-5	R-0	R-6	High Heat/Cool
18	25%	0.65	R-30	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
19	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
20	30%	0.60	R-26	R-11	R-19	R-8	R-2	R-19	High Heat/Cool
21	30%	0.55	R-19	R-13	R-13	R-6	R-0	R-10	High Heat/Cool

FOOTNOTES

1. Glazing Area is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. The nominal area or rough opening is acceptable for flat windows. Up to 1% of the total allowed glazing area may be excluded from the U-factor requirement. For example, 3 ft² of decorative glass may be excluded from a building design with 300 ft² of glazing area.

2. Glazing U-Factors must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure or taken from the glazing U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.
Center-of-glass U-factors cannot be used.

3. The **Ceiling R-values** do not assume a raised or oversized truss construction. If the insulation achieves the full insulation thickness over the plate lines of exterior walls, R-30 insulation may be substituted for R-38 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.
4. Wall R-Values represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include R-values for air films, exterior siding, "housewraps", structural sheathing, or interior drywall. For example, an R-19 requirement could be met EITHER by R-19 cavity insulation OR R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame wall constructions. Metal-frame wall or mass (concrete, masonry, log) wall equivalent R-values can be found in the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

5. The **Floor R-Value** requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air (such as cantilevers, bay windows, etc.) must meet the ceiling requirements.

6. Basement Wall R-Values apply to walls of conditioned basements below uninsulated floors and must be insulated from the top of the basement wall to a depth of 10 ft below grade or to the level of the basement floor, whichever is less. The entire opaque portion of any individual basement wall with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Windows and sliding glass doors of conditioned basements must be included with the other glazing.

7. The **Slab Perimeter R-Value** requirements are for unheated slabs. Add an additional R-2 for heated slabs. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 24 in. in Zones 2-12. The insulation must extend: 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation. Exterior exposed insulation shall be protected.

8. The **Crawl Space Wall R-Value** requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the rim joist and sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

9. Normal refers to the efficiency requirements according to the National Appliance Energy Conservation Act (NAECA). It represents the minimum equipment efficiency which can be legally sold in the U.S. **High Heating** means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. **High Cooling** means a SEER of 12 or more. **High Heat/Cool** means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than
one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package.

Notes:
The maximum **Door U-factor** is 0.35 for solid doors. One door may be excluded from this requirement. If a door contains glass and an aggregate U-factor is not available, include the glass area with your glazing and use the non-glazed door U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

OTHER REQUIREMENTS OF THE PRESCRIPTIVE PACKAGE

Vapor Retarders
Vapor retarders (with a maximum perm rating of 1.0) must be installed on the "warm-in-winter" side of all non-vented framed ceilings, walls and floors.

Air Leakage
All penetrations to the building envelope must be sealed, caulked, gasketed, weather-stripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc. Recessed lights must meet one of the following conditions:

- **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity.
- **Type IC or non-IC** rated and installed in a sealed box constructed from 1/2" gypsum wallboard or other approved assembly.
- **Type IC** rated, tested and labeled as to being "airtight".

Service Water Heating
Water heaters with pipe risers shall have heat traps on both the inlet and outlet of the water heater unless the water heater has integral heat traps or is part of a circulating system. Typical methods used for creating heat traps are "U" or "rams horn" bends in the flexible pipe connectors or installing aftermarket pipe nipples with integral traps.

Duct Insulation

Supply and return-air ducts located within crawlspaces, uninsulated basements, attics and framed wall cavities must be insulated to **R-6.5**. Ductwork located on the exterior of the building must be insulated to **R-8**.

Duct Construction

All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or approved tapes. Standard duct tape is not permitted.

Temperature Controls

Thermostats must be capable of being set down to 55°F or lower for heating and up to 85°F or more for cooling. Thermostats for both heating and cooling must have a deadband (temperature range where no heating or cooling takes place) of at least 5°F. Heat pumps require a thermostat capable of preventing back-up heat from operating when the heating requirements can be met by the heat pump alone.

METHOD 3

RESIDENTIAL BUILDING DESIGN BY COMPONENT PERFORMANCE APPROACH

This method requires overall thermal performance by building components such as walls, floor, ceilings, etc.

Basic Requirements:

HEATING AND COOLING CRITERIA			
ELEMENT	**MODE**	**TYPE A-1 RESIDENTIAL BUILDINGS**	**TYPE A-2 RESIDENTIAL BUILDINGS**
		Uo	**Uo**
Walls	**Heating or cooling**	**0.146**	**0.215**
Roof/ceiling	**Heating or cooling**	**0.032**	**0.032**
Floors over unheated spaces	**Heating or cooling**	**0.05**	**0.05**
Heated slab on grade b,f	**Heating**	**R-value = 6.15**	**R-value = 6.15**
Unheated slab on grade c,d,f	**Heating**	**R-value = 4.13**	**R-value = 4.13**
Basement wall e,f	**Heating or cooling**	**U-factor = 0.1**	**U-factor = 0.1**
Crawl space wall e, f	**Heating or cooling**	**U-factor = 0.069**	**U-factor = 0.069**

For SI: 1 Btu/h · ft² °F = 5.678 W/ (m² · K), °C = (°F)-32/1.8.

a. Values shall be determined by using the graphs Figures 502.2(1), 502.2(2), 502.2(3), 502.2(4), 502.2(5) and 502.2(6)] using HDD as specified in Section 302.

b. There are no insulation requirements for heated slabs in locations having less than 500 Fahrenheit HDD.

c. There are no insulation requirements for unheated slabs in locations having less than 2,500 Fahrenheit HDD.

d. Slab edge insulation is not required for unheated slabs in areas of very heavy termite infestation probability in accordance with Section 502.2.1.4, and as shown in Figure 502.2(7).

e. Basement and crawl space wall U-factors shall be based on the wall components and surface air films. Adjacent soil shall not be considered in the determination of the U-factor.

f. Typical foundation insulation techniques can be found in the DOE Building Foundation Design Handbook.

COMPONENT PERFORMANCE PACKAGE WORKSHEET

Applicant Name _____ Date _____

Applicant Address _____

Phone Number _____

Building Address _____ Permit (A/P) # _____

EXTERIOR WALL ASSEMBLY					
Component	**Description**	**R-Value**	**U-Factor U=1/R**	**Area (ft^2)**	**A×U**
Wall 1					
Wall 2					
Window 1					
Window 2					
Door 1					
Door 2					
Other					
TOTAL					
Uo	**Overall Uo for exterior wall = $(A \times U)_{total} \div A_{total}$**	**Uo =**			

☐ **Meets Code** ☐ **Does not meet Code**

FLOOR ASSEMBLY					
Component	**Description**	**R-Value**	**U-Factor U=1/R**	**Area (ft^2)**	**A×U**
Floor 1					
Floor 2					
Other					
TOTAL					
Uo	**Overall Uo for floor assembly = $(A \times U)_{total} \div A_{total}$**	**Uo =**			

☐ **Meets Code** ☐ **Does not meet Code**

ROOF/CEILING ASSEMBLY					
Component	**Description**	**R-Value**	**U-Factor U=1/R**	**Area (ft^2)**	**A×U**
Ceiling 1					
Ceiling 2					
Skylight					
Other					
TOTAL					
Uo	**Overall Uo for roof assembly = $(A \times U)_{total} \div A_{total}$**	**Uo =**			

☐ **Meets Code** ☐ **Does not meet Code**

BASEMENT WALL ASSEMBLY			
Component	**Description**	**R-Value**	**U-Factor U=1/R**
Basement wall			

☐ **Meets Code** ☐ **Does not meet Code**

CRWAL SPACE WALL ASSEMBLY			
Component	**Description**	**R-Value**	**U-Factor U=1/R**
Crawl space wall			

☐ **Meets Code** ☐ **Does not meet Code**

OVERALL ENVELOPE CONFORMANCE					
ASSEMBLY	**Uo**	**$U_{required}$**	**TOTAL AREA**	**A×Uo**	**A×$U_{required}$**
Exterior Wall Assembly					
Floor Assembly					
Roof/Ceiling Assembly					
Total (A×Uo)					
Total (A×$U_{required}$)					

If the Total A×Uo is less than the Total A×$U_{required}$ the building complies with the IECC even though the individual components do not. Basement and crawl space walls must meet the requirements in basic requirement table above.

I hereby certify that the proposed building design represented in these construction documents has been designed to meet the requirements of the Montgomery County Energy Code.

Builder/Designer/Contractor Company Name Date

METHOD 4
ALTERNATE METHOD

Montgomery County recognizes and accepts the use of the REScheck™ program. You may download a working copy of the REScheck™ at **www.energycodes.gov**.

REScheck™ program can also be used for checking compliance in instances where the proposed construction does not conform to any of the three methods prescribed in this package.

ADDITIONS

Additions, alterations, and repairs to existing buildings must comply with energy code requirements. ***One-story additions of 200 square feet, or less are exempt from having to meet the requirements of the energy code per Montgomery County Executive Regulation 36-01.***

"For the purpose of the energy code", an addition is any extension or increase in the height, conditioned floor area, or conditioned volume of a building. An alteration is any construction renovation, or change in the mechanical system that involves an extension, addition, or change to the arrangement, type, or purpose of the original installation.

A repair includes the reconstruction or renewal of any part of an existing building for maintenance purposes.

Additions include new construction, such as a conditioned bedroom, sunspace, or enclosed porch added to an existing building. Additions also include existing spaces converted from unconditioned or exempt spaces to conditioned spaces. For example, a finished basement, an attic converted to a bedroom, and a carport converted to a den, are additions. An unconditioned garage converted to a bedroom is an addition, but the addition of an unconditioned garage would not be considered within the scope of the code, since the code applies to heated or cooled (conditioned) spaces. If a conditioned floor area is expanded, such as a room made larger by moving out a wall, only the newly conditioned space must meet the code. A flat window added to a room does not increase the conditioned space and thus is not an addition by this definition.
However, replacement windows that are not part of an addition must meet the prescriptive U-factor requirements given in Table below.

COMPLIANCE OPTIONS FOR ADDITIONS

An addition can comply with the energy code by three approaches:

1. The addition as defined above meets all code requirements. This approach does not require that the original portion of the building meet code requirements.

2. If the building with the addition complies with the code, the addition will also comply. For example, a sunroom that does not comply with the code is added to a house. If the entire house (with the sunroom) complies, the addition also complies.

3. Additions less than 500 ft^2 (46.5 m^2) of conditioned floor area may meet the prescriptive envelope requirements in Table below. To use this table, the total area of windows, doors, and skylights cannot exceed 40% of the gross wall and roof area of the addition.

PRESCRIPTIVE REQUIREMENTS FOR ADDITIONS
(Montgomery County is Zone 10)

MAXIMUM	MINIMUM					
Fenestration U-factor (a)	**Ceiling R-value (b)**	**Wall R-value**	**Floor R-value**	**Basement Wall R-value**	**Slab perimeter R-value And depth (c)**	**Crawl space wall R-value (d)**
0.4	R-38	R-18	R-21	R-10	R-9, 2 ft	R-19

a. The area-weighted average U-factor for all windows, doors, and skylights in the addition must not exceed the fenestration U-factor requirement.
b. Floors over outside air must meet ceiling R-value requirements.
c. The slab R-value requirements are for unheated slabs. Add an additional R-2 for heated slabs.
d. The crawl space wall R-value requirements are for walls of unventilated crawl spaces only.
e. The maximum U-factor for replacement skylights is 0.5 in Zones 5-19.
f. The area-weighted average solar heat gain coefficient (SHGC) of all windows, glazed doors, and skylights cannot exceed 0.4 in Zones 1-7.

REPLACEMENT WINDOWS

Although a permit is not required to replace windows, replacement windows that are not part of an addition must meet the prescriptive requirements of the above Table. A replacement window is defined as a replacement of the entire unit, including the frame, sash, and glazing.